Thermo Scientific
EK20/EK30
Immersion Coolers

Thermo Scientific Manual P/N U01183 Rev. 12/17/14

Installation
Operation

Visit our Web site at:

http://www.thermoscientific.com/tc
Product Service Information, Applications Notes, MSDS Forms, e-mail.

Voice Info: (800) 258-0830

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Warranty

Laboratory Equipment Div.
25 Nimble Hill Road
Newington, NH 03801

DECLARATION OF CONFORMITY

Manufacturer: Thermo Fisher Scientific

Address: 25 Nimble Hill Road
Newington, NH USA 03801

CE

Year of inception 2013

Products: EK Immersion Coolers.

We declare that the following products conform to the Directives and Standards listed below:

Thermo Fisher Scientific EK models 20, 30, 45 and 90.

All rated:

1. 115 Volts, 60 Hz or
2. 208-230 Volts, 60 Hz or
3. 230 Volts, 50 Hz

Equipment Class: Measurement, control and laboratory

Directives and Standards:

2004/108/EC – Electromagnetic Compatibility (EMC Directive):

EN 61326-1: 2006 – Electrical Equipment For Measurement, Control, And Laboratory Use EMC Requirements, EMC Class A

2006/95/EC – Low Voltage Directive (LVD):

EN 61010-1: 2010 – Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use – General Requirements.

2011/65/EU - Restriction of the Use of Certain Hazardous Substances In Electrical and Electronic Equipment (ROHSD).

EN 50581: 2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Manufacturer's Authorized Representative:

Mark Sinclair Director of Engineering

Date: 17 Dec. 2014

Preface

WEEE Compliance

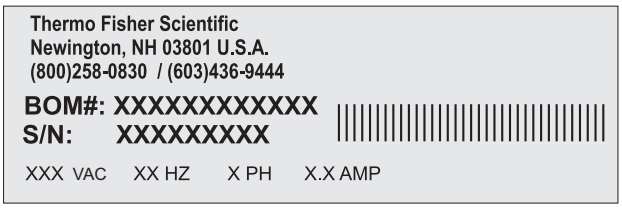
This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:

Thermo Fisher Scientific has contracted with one or more recycling/ disposal companies in each EU Member State, and this product should be disposed of or recycled through them.

Further information on Thermo Fisher Scientific compliance with these Directives, the recyclers in your country, and information on Thermo Fisher Scientific products which may assist the detection of substances subject to the RoHS Directive are available at www.thermofisher.com/ WEEERoHS

After-sale Support

Thermo Fisher Scientific is committed to customer service both during and after the sale. If you have questions concerning the cooler operation, or questions concerning spare parts or Service Contracts, call our Sales, Service and Customer Support phone number, see this manual's inside cover for contact information.



Sample Nameplate

Before calling, please obtain the serial number printed on the nameplate located on the upper rear of the cooler.

Feedback

We appreciate any feedback you can give us on this manual. Please e-mail us at tcmanuals@thermofisher.com. Be sure to include the manual part number and the revision date listed on the front cover.

Warranty

Thermo Scientific Immersion Coolers have a warranty against defective parts and workmanship for 24 months from date of shipment. See back page of this manual for more details.

Unpacking

Retain all cartons and packing material until the cooler is operated and found to be in good condition. If the cooler shows external or internal damage contact the transportation company and file a damage claim. Under ICC regulations, this is your responsibility.

Take into account its weight when unpacking and transporting. We recommend two people lift the cooler. ▲

NOTE Leave coolers in an upright position at room temperature (~25°C) for 24 hours before starting. This will ensure the lubrication oil has drained back into the compressor. ▲

Section 1 Safety

Safety Warnings

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your cooler. If you have any questions concerning the operation of your cooler or the information in this manual, please contact us. See inside cover for contact information.

DANGER indicates an imminently hazardous situation which, if not avoided, *will* result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It is also be used to alert against unsafe practices.

The lightning flash with arrow symbol, within an equilateral triangle, is intended to alert the user to the presence of non-insulated "dangerous voltage" within the cooler's enclosure. The voltage magnitude is significant enough to constitute a risk of electrical shock.

This label indicates read the manual.

NOTE The cooler's equipment design incorporates a complete sheet metal enclosure for personnel protection from mechanical and electrical hazards. ▲

Observe all warning labels. ▲

Never remove warning labels. ▲

Use the cooler solely for the intended application. Do not operated in rooms used for medical purposes and/or in the vicinity of patients. ▲

The cooler construction provides protection against the risk of electrical shock by grounding appropriate metal parts. The protection will not function unless the power cord is connected to a properly grounded outlet. It is the user's responsibility to assure a proper ground connection is provided. ▲

Operate the cooler using only the supplied line cords, never operate equipment with damaged cords. ▲

Ensure all electrical connections are made prior to starting the cooler. ▲

Always turn the cooler off and disconnect the supply voltage from its power source before moving performing any service or maintenance procedures. Ensure cooler is at a safe temperature before handling. ▲

Never place the cooler in a location or atmosphere where excessive heat, moisture, or corrosive materials are present. ▲

Leave cooler in an upright position at room temperature (~25°C) for 24 hours before starting. This will ensure the lubrication oil has drained back into the compressor. ▲

Other than water, before using any fluid, or when performing maintenance where contact with the fluid is likely, refer to the manufacturer's MSDS and EC Safety Data sheet for handling precautions. ▲

The cooler's evaporator coil must not be kinked, bent or twisted. This can lead to evaporator coil damage and a refrigeration leakage. ▲

Ensure, that no toxic gases can be generated by the fluid. Flammable gases can build up over the fluid during usage. ▲

Never use corrosive or flammable fluids with this cooler. Use of these fluids will void the manufacturer's warranty. ▲

Never operate the cooler with panels removed. ▲

Transport the cooler with care. Sudden jolts or drops can damage its components. ▲

Do not clean the cooler with solvents, only use a soft cloth and water. ▲

Refer service and repairs to a qualified technician. ▲

Performance of installation, operation, or maintenance procedures other than those described in this manual may result in a hazardous situation and will void the manufacturer's warranty. ▲

Personal Protective Equipment

The are no special personal protective equipment requirements needed to perform normal operation. We do recommend wearing eye protection and gloves.

Training

The user must review and understand all the sections in this manual before operating the cooler.

Section 2 General Information

Description and Intended Use

The external evaporator (cooling coil) is immersed into a bath. The coil must be completely immersed.

The lowest bath temperature depends on the following factors:

- the volume of heat transfer liquid
- the bath vessel insulation
- the heat conductivity of the cooled liquid
- the heat generated within the bath

Cooling a bath vessel:

The coolers do not have a built-in controller. They cool the object to the lowest possible temperature (governed by the specific properties of the object). Since the liquid is usually not in motion, expect a wide temperature distribution.

Cooling an open-bath circulator:

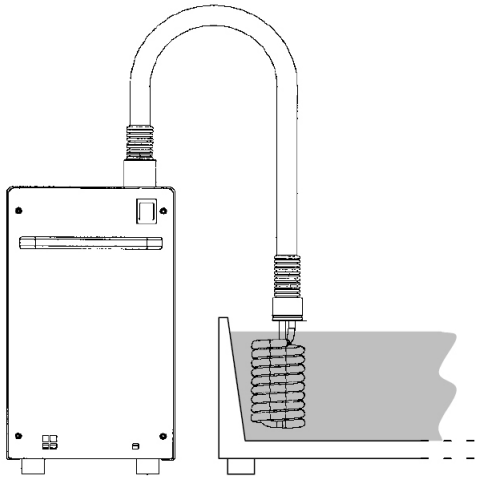
Open-bath circulators are equipped with their own heater and pump. The cooler operates as a permanent cooling source. Because the circulator operates by controlled counter-heating, it is possible to attain both a constant bath temperature level and an even distribution.

EK20:

This cooler is designed to cool alcohol in a 5 liter Dewar vessel down to approximately −20°C. Constant temperature controlling is achieved by regulated counter-heating using an open-bath circulator.

EK30:

The EK30 is the more powerful version of the EK20 and is designed for baths with a depth of at least 200 mm. It is capable of temperatures as low as −30°C in a 5 liter Dewar vessel.

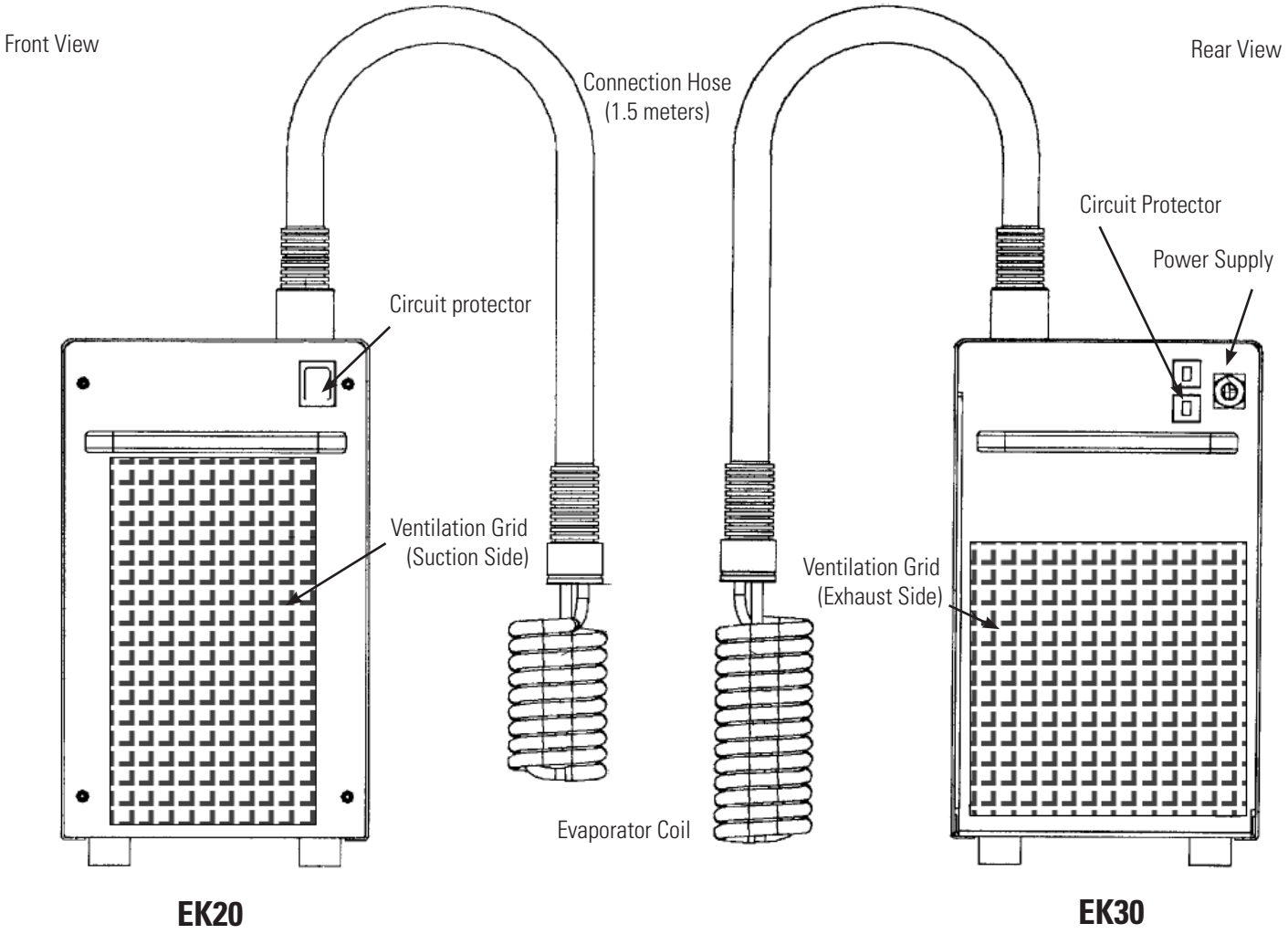


Specifications/ Equipment Ratings

	EK20	EK30
Working Temperature Range[1]	-20°C to +150°C -4°F to +302°F	-30°C to +150°C -22°F to +302°F
Ambient Temperature Range[2]	+10°C to +40°C +50°F to +104°F	+10°C to +40°C +50°F to +104°F
Maximum Relative Humidity (Non Condensing)	80%/31°C to 50%/40°C	80%/31°C to 50%/40°C
Operating Altitude	Sea Level to 2000 meters (6560 feet)	Sea Level to 2000 meters (6560 feet)
Pollution Degree	2	2
Overvoltage Category	II	II
Degree of Protection	IP20	IP20
Sound Level[3]	less than 58 dBA	less than 58 dBA
Cooling Capacity at +20°C at -10°C	300 watts 150 watts	400 watts 250 watts
Compressor Cooling	Air	Air
Refrigerant	R134A (3.9 ounces)	R134A (3.9 ounces)
Hose Length	150 cm	150 cm
Cooling Coil (Ø x L)	81 x145 mm	13 x 900 mm
Cooler Dimensions (H x W x D)	380 x 225 x 465 mm	380 x 225 x 465 mm
Evaporator Material	300 Series Stainless Steel	300 Series Stainless Steel
Nominal Weight kg/lb	25.0 / 55.1	26.0 / 57.3
Electrical Requirements[5]	230V/50Hz or 115V/60Hz	230V/50Hz or 115V/60Hz
Total Maximum Wattage	400VA	600VA
Rear Panel Fuse Values		
115V	1 x 10A	1 x 10A
230V	2 x 5A	2 x 5A

1. The lowest temperatures which can be reached using these coolers, respective cooling down times and temperature accuracy depend on the following factors: the volume of heat transfer liquid, the type of heat transfer liquid and it's viscosity at the desired temperature, the bath vessel and covering insulation, the heat created by units immersed in the bath used to recirculate the heat transfer liquid.
2. The cooling capacity is reduced at ambient temperatures of > 30°C.
3. 1 meter from unit.
4. Never bend the probe when it is cold.
5. Nominal values ±10%.

• Thermo Fisher Scientific reserves the right to change specifications without notice.



115V coolers have only one circuit protector

Section 3 Installation

The immersion circulator is designed for continuous operation and for indoor use.

CAUTION

Never place the cooler in a location where excessive heat, moisture, inadequate ventilation, or corrosive materials are present. ▲

CAUTION

Leave coolers in an upright position at room temperature (~25°C) for 24 hours before starting. This will ensure the lubrication oil has drained back into the compressor. ▲

Ventilation

The cooler requires clean air for proper operation. Air enters from the front and exits through the rear

Electrical Requirements

DANGER

The cooler construction provides protection against the risk of electrical shock by grounding appropriate metal parts. The protection will not function unless the power cord is connected to a properly grounded outlet. It is the user's responsibility to assure a proper ground connection is provided. ▲

The cooler is intended for use on a dedicated outlet.

CAUTION

The cooler's power cord is the electrical disconnecting device, it must be easily accessible at all times. ▲

Operate the cooler using only the supplied line cords, never operate equipment with damaged cords. ▲

Refer to the nameplate on the rear of the cooler for specific electrical requirements. Voltage range deviations of ± 10% are permissible. The outlet must be rated as suitable for the total power consumption of the cooler.

CAUTION

Ensure the electrical cords do not come in contact with the evaporator coil or hose. ▲

Fluid Considerations

DANGER

Only use the approved fluids listed below. Never use corrosive or flammable fluids with this cooler. ▲

CAUTION

Handle and dispose all liquids in accordance with the fluid manufacturers specification and/or the MSDS for the fluid used. ▲

Fisher Scientific takes no responsibility for damages caused by the selection of an unsuitable fluid.

Unsuitable bath fluids are fluids which:

- are very highly viscous (much higher than 30 mPas at the respective working temperature) or
- have corrosive characteristics or

For fluid selection consider application requirements, operating temperature range, material compatibility, safety concerns, and environmental issues.

Approved Fluids

-10°C to 40°C — 50/50 Water with Laboratory Grade Ethylene Glycol Below 5°C water has to be mixed with a glycol. The amount of glycol added should cover a temperature range 5°C lower than the operating temperature of the particular application. This will prevent the water/glycol from gelling (freezing) near the evaporating coil.

50% ethylene glycol is the maximum recommendation. Excess glycol deteriorates the temperature accuracy due to its high viscosity.

-30°C to 40°C — Synth 60 Synthetic heat transfer liquids are hygroscopic and require frequent changing.

-30°C to 40°C — SIL 100 This liquid has very long term stability. Due to the high viscosity at low temperatures we recommend using a stirrer.

Fisher Scientific heat transfer fluids are supplied with an EC Safety Data Sheet.

CAUTION

Ensure, when selecting the heat transfer fluid, that no toxic gases can be generated. Inflammable gases can build up over the fluid during usage. ▲

Start Up
Shut Down

⚠ CAUTION

Leave the cooler in an upright position at room temperature (~25°C) for 24 hours before starting. This will ensure the lubrication oil has drained back into the compressor. ▲

Immerse the cooling coil (evaporator) of the cooler into a suitable bath vessel. The coil must be completely covered with liquid otherwise ice will form.

- To start the cooler place the circuit protector located on the front of the cooler to the **I** position.

Once the unit is turned on, the refrigeration system will reduce the temperature of the cooling fluid in the work area to the lowest achievable temperature under the existing heat load conditions.

For best results we recommend stirring or agitation in the work area. When not stirred, cooling capacities will be reduced and the work area will show temperature layering, with the coldest, most dense zone at the bottom.

- To stop the cooler place the circuit protector located on the front of the cooler to the **O** position.

When the unit is shut off, wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.

Shipment/Storage

Do not store the cooler below -20°C, and <80% relative humidity.

Decommissioning/ Disposal

Decommissioning prepares equipment for safe and secure transportation.

Decommissioning must be performed only by qualified dealer using certified equipment. All prevailing regulations must be followed. ▲

Consider decommissioning the cooler when:

- It fails to maintain desired specifications
- It no longer meets safety standards
- It is beyond repair for its age and worth

Refrigerant and compressor oil must be recovered from equipment before disposal.

Direct questions about cooler decommissioning or disposal to our Sales, Service and Customer Support.

Handle and dispose fluids in accordance with the manufacturers specification and/or the MSDS for the material used. ▲

Section 4 Preventive Maintenance

CAUTION

Disconnect the power cord prior to performing any maintenance. ▲

CAUTION

Handle the cooler with care. Sudden jolts or drops can damage its components. ▲

There are no user serviceable components within the cooler's cabinet. Only Thermo Fisher should provide any required replacement parts.

Cleaning

Clean the cooler's surface with a soft cloth and warm water only.

Evaporator Coil

Quickly remove substances containing acidic or alkaline substances and metal shavings. They will harm the surfaces and could cause corrosion.

Condenser

For proper operation, the cooler needs to pull air through a condenser. A build up of dust or debris on the fins of the condenser will lead to a loss of cooling capacity.

Use a brush, or if necessary compressed air, to clean the condenser fins. The frequency of cleaning depends on the operating environment. We recommend making a monthly visual inspection of the condenser after initial installation. After several months, the cleaning frequency will be established.

Fluid Maintenance

The cooling fluid in the work area should be periodically replaced when operating at low temperatures. At low temperatures, the cooling fluid may collect water vapor from the air. As the concentration of water in the cooling fluid increases, performance is adversely affected.

Section 5 Troubleshooting

Cooler will not start

Check the controller for error codes, see Error Codes in this section.

Ensure the circuit protector is in the on (**I**) position.

Make sure supply voltage is connected and matches the cooler's nameplate rating ±10%.

Inadequate temperature control

Check for ice build up on the cooling probe. A layer of ice will act as insulation and reduce the cooling capacity. Ice build up is often an indication that the cooling fluid needs replacing. Defrost the cooling probe and change the cooling fluid.

Make sure the condenser is free of dust and debris.

Ensure cooler installation complies with the site requirements in Sections 2 and 3.

Make sure supply voltage matches the cooler's nameplate rating ±10%.

If the temperature continues to rise, make sure your application's heat load does not exceed the rated specifications.

Check for high thermal gradients (e.g., the application load is being turned on and off or rapidly changing).

Cooler shuts down

Ensure the circuit protector is in the on (**I**) position.

Make sure supply voltage is connected and matches the cooler's nameplate rating ±10%.

When the unit is shut off, wait approximately five minutes before restarting This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle.

Please contact Thermo Fisher Scientific Sales Service and Customer Support if you need any additional information, see inside cover for contact instructions.

WARRANTY

Thermo Fisher Scientific warrants for 24 months from date of shipment any Thermo Scientific product according to the following terms.

Any part of the product manufactured or supplied by Thermo Fisher Scientific and found in the reasonable judgment of Thermo Fisher to be defective in material or workmanship will be repaired at an authorized Thermo Fisher Repair Depot without charge for parts or labor. The product, including any defective part must be returned to an authorized Thermo Fisher Repair Depot within the warranty period. The expense of returning the product to the authorized Thermo Fisher Repair Depot for warranty service will be paid for by the buyer. Our responsibility in respect to warranty claims is limited to performing the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or recision of the contract of sales of any product. With respect to products that qualify for field service repairs, Thermo Fisher Scientific's responsibility is limited to the component parts necessary for the repair and the labor that is required on site to perform the repair. Any travel labor or mileage charges are the financial responsibility of the buyer.

The buyer shall be responsible for any evaluation or warranty service call (including labor charges) if no defects are found with the Thermo Scientific product.

This warranty does not cover any product that has been subject to misuse, neglect, or accident. This warranty does not apply to any damage to the product that is the result of improper installation or maintenance, or to any product that has been operated or maintained in any way contrary to the operating or maintenance instructions specified in this Instruction and Operation Manual. This warranty does not cover any product that has been altered or modified so as to change its intended use.

In addition, this warranty does not extend to repairs made by the use of parts, accessories, or fluids which are either incompatible with the product or adversely affect its operation, performance, or durability.

Thermo Fisher Scientific reserves the right to change or improve the design of any product without assuming any obligation to modify any product previously manufactured.

THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

OUR OBLIGATION UNDER THIS WARRANTY IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE COMPONENT PARTS AND Thermo Fisher Scientific DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION.

Thermo Fisher Scientific ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO LOSS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR REVENUE, LOSS OF THE PRODUCT, LOSS OF TIME, OR INCONVENIENCE.

This warranty applies to products sold by Thermo Fisher Scientific. (Refer to the warranty for products sold by the affiliated marketing company of Thermo Fisher Scientific for any additional terms.) This warranty and all matters arising pursuant to it shall be governed by the law of the State of New Hampshire, United States. All legal actions brought in relation hereto shall be filed in the appropriate state or federal courts in New Hampshire, unless waived by Thermo Fisher Scientific.

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